SIEMENS

syngo® Dynamics Server

SIEMENS AG - Healthcare Sector

DICOM Conformance Statement

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1. INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This conformance statement describes the DICOM Interface of the *syngo*® Dynamics implementation of a Medical Imaging Storage and Archive System (*syngo*® Dynamics DICOM Server) running Software Version 8.0. From this point forward, syngo® Dynamics DICOM Server will be referred to as *syngo Dynamics Server*.

The *syngo Dynamics Server* DICOM Interface acts as a service class provider (SCP) for Storage, Storage Commitment, MPPS, Verification and Query/Retrieve Service Classes.

The *syngo Dynamics Server* DICOM Interface acts as a service class user (SCU) for Storage, Storage Commitment, Verification, Query/Retrieve, MPPS, Patient Management, Study Management, Results Management and Basic Worklist Management Service Classes.

This DICOM Conformance Statement is written according to part PS 3.2 of the DICOM 3.0 standard.

1.2 SOURCES FOR THIS DOCUMENT

ACR-NEMA Digital Imaging and Communications in Medicine (DICOM) Version 3.0 Parts 1 – 14.

1.3 ACRONYMS AND ABBREVIATIONS

The following Acronyms and abbreviations are used in this document:

- ACR — American College of Radiology
- AE — Application Entity
- DICOM — Digital Imaging and Communications in Medicine
- FSC — File-set Creator
- FSR — File-set Reader
- FSU — File-set Updater
- NEMA — National Electrical Manufacturers Association
- PDU — Protocol Data Unit
- SCP — Service Class Provider
- SCU — Service Class User
- SOP — Service Object Pair
- SR — Structured Report
- TCP/IP — Transmission Control Protocol/Internet Protocol
- UID — Unique Identifier

1.4 CONNECTIVITY AND INTEROPERABILITY

The implementation of the *syngo Dynamics Server* DICOM interface has been tested to assure correspondence with this Conformance Statement. But the Conformance Statement and the DICOM standard does not guarantee interoperability.

The user must compare the relevant Conformance Statements and if a successful interconnection should be possible, the user is responsible to specify an appropriate test suite and to validate the interoperability, which is required.

A network environment may need additional functions out of the scope of DICOM.

2. IMPLEMENTATION MODEL

syngo Dynamics Server is an image database and storage facility. *syngo Dynamics Server* is a single application entity that stores images sent to it by service class users, takes responsibility for storage of the objects, allows queries based on several standard query models, and retrieves requested images. The *syngo Dynamics Server* is able to reconcile object header information before the images are stored internally by querying a modality worklist service class provider for demographic information. Studies found to be registered with the HIS/RIS are stored, while studies not found to be registered are automatically corrected, where possible, or set aside for a technician to correct. Study status messages can be sent to service class providers and received from service class users to reflect changes in the state of the study.

2.1 APPLICATION DATA FLOW DIAGRAM

Figure 2.1-1 depicts the DICOM data flow to and from *syngo Dynamics Server*. This section discusses the application's data flow represented in this diagram.

In the remote real-world activity labeled "Verify Communication", a remote application entity (AE) initiates an association and requests verification from syngo Dynamics Server. Assuming *syngo Dynamics Server* receives the request, it responds to the remote AE and communication between the two AE's has been verified. *syngo Dynamics Server* can also initiate an association and request verification to a remote AE.

In the remote real-world activity "Store Objects", a remote AE initiates an association with syngo Dynamics Server and sends one or more objects to *syngo Dynamics Server*. When syngo Dynamics Server receives an object, it stores that object in Part 10 format on some media and registers that object in the database. *syngo Dynamics Server* can also initiate an association and send one or more objects to a remote AE.

In the remote real-world activity "Request Storage Commitment", a remote AE initiates an association with *syngo Dynamics Server* and requests commitment for the safekeeping of one or more composite SOP instances on syngo Dynamics Server. *syngo Dynamics Server* will open a new association with the remote AE to indicate success or failure. *syngo Dynamics Server* can also initiate an association and request commitment for the safekeeping of one or more composite SOP instances to a remote AE.

In the remote real-world activity "Find Objects", a remote AE initiates an association with syngo Dynamics Server and sends a query. *syngo Dynamics Server* will search the database for possible matches with composite SOP instances. The results of the query are returned to the remote AE using the same association. *syngo Dynamics Server* can also initiate an association and send a query to a remote AE.

In the remote real-world activity "Move Objects", a remote AE initiates an association with syngo Dynamics Server and requests some composite SOP instances be retrieved. *syngo Dynamics Server* will search the database for possible matches with composite SOP instances. The resulting composite SOP instances are transferred to either the same AE that requested the retrieval or to another AE over a new association. *syngo Dynamics Server* can also initiate an association and request some composite SOP instances be retrieved from a remote AE.

In the remote real-world activity "Get Worklist", syngo Dynamics Server initiates an association with a remote AE and sends a query for information about a patient or study. *syngo Dynamics Server* will update Composite SOP instances with information obtained from the query.

In the remote real-world activity "Unsolicited Notifications", a remote AE initiates an association with *syngo Dynamics Server* and sends an unsolicited notification event containing changes in the state of a patient, study, visit, or interpretation. If the particular notification event is recognized, then syngo Dynamics Server updates its database or performs events based on configuration settings.

In the remote real-world activity “Study Update”, a remote AE initiates an association with *syngo Dynamics Server* and sends an MPPS message indicating the status of a study being performed. *syngo Dynamics Server* will reflect the status changes accordingly. *syngo Dynamics Server* can also initiate an association with a remote AE and provide status information.

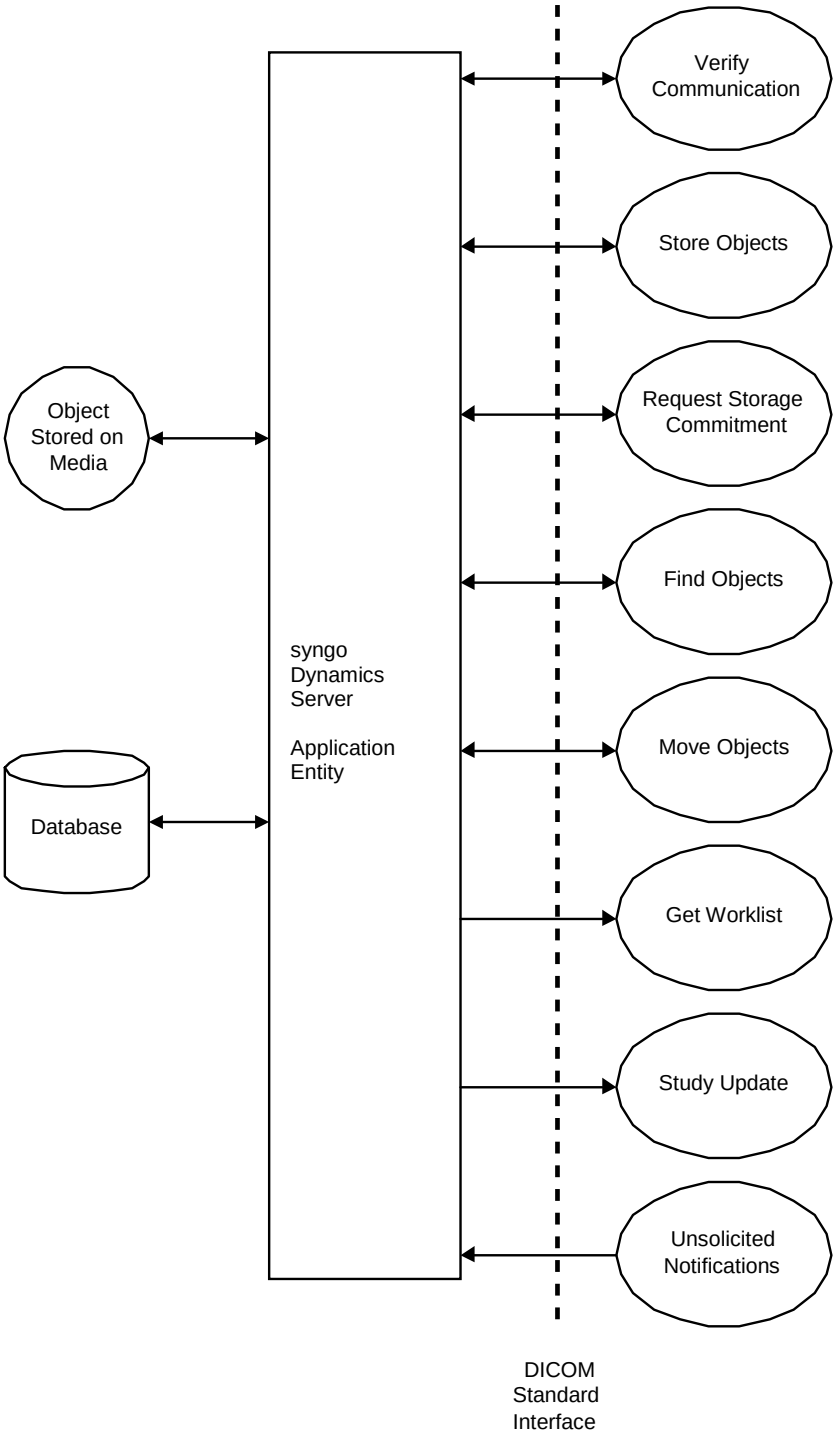

Figure 2.1-1 *syngo Dynamics Server* Implementation Model

2.2 FUNCTIONAL DEFINITION OF APPLICATION ENTITIES

syngo Dynamics Server operates as a single AE whose title is configurable. Its functions are described in section 2.1.

2.3 SEQUENCING OF REAL WORLD ACTIVITIES

- *syngo Dynamics Server* must store objects to a remote AE before a storage commitment request for those objects is sent.
- *syngo Dynamics Server* must receive objects from a remote AE before a study update is sent outbound.
- If configured to archive objects to PACS, syngo Dynamics Server may request objects be moved from a remote AE to local media to service an object move request from another remote AE.

3. APPLICATION ENTITY SPECIFICATIONS

syngo Dynamics Server operates as a single application entity.

3.1 *syngo Dynamics Server* SPECIFICATIONS

The *syngo Dynamics Server* Application Entity provides Standard Conformance to the DICOM V3.0 SOP Classes listed in Table 3.1-1 as an SCU and/or SCP:

SOP Class	SOP Class UID	SCU/SCP
Verification	1.2.840.10008.1.1	Y/Y
Basic Study Content Notification	1.2.840.10008.1.9	Y/N
Storage Commitment Push Model	1.2.840.10008.1.20.1	Y/Y
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Y/N
Detached Visit Management	1.2.840.10008.3.1.2.2.1	Y/N
Detached Study Management	1.2.840.10008.3.1.2.3.1	Y/N
Study Component Management	1.2.840.10008.3.1.2.3.2	Y/N
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Y/Y
Detached Interpretation Management	1.2.840.10008.3.1.2.6.1	Y/N
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Y/Y
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Y/Y
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Y/Y
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Y/Y
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Y/Y
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Y/Y
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Y/Y
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Y/Y
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Y/Y
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Y/Y
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Y/Y
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Y/Y
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Y/Y
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Y/Y
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Y/Y
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Y/Y
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Y/Y
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Y/Y
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Y/Y
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Y/Y
X-ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Y/Y
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Y/Y
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Y/Y
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Y/Y
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Y/Y
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Y/Y
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Y/Y
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	Y/Y
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	Y/Y

SOP Class	SOP Class UID	SCU/SCP
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1	Y/Y
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2	Y/Y
Patient/Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1	Y/Y
Patient/Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2	Y/Y
Modality Worklist Information Model C-Find	1.2.840.10008.5.1.4.31	Y/N

Table 3.1-1 *syngo*® Dynamics DICOM Server Supported SOP Classes

3.1.1 Association Establishment Policies

3.1.1.1 General

The following Application Context Name will be proposed and recognized by *syngo Dynamics Server*:

- DICOM 3.0 Application Context 1.2.840.10008.3.1.1.1

syngo Dynamics Server is limited to a maximum PDU Size of 34464 as an SCU and SCP. It will send the value of 34464 in DICOM Association Negotiations.

3.1.1.2 Number of Associations

The maximum number of simultaneous associations accepted by *syngo Dynamics Server* is configurable at run time based on system resources available. By default, the maximum number of associations is set at 64. There is no inherent limit to the number of associations other than limits imposed by the computer operating system.

3.1.1.3 Asynchronous Nature

syngo Dynamics Server allows a single outstanding operation on any association. Therefore, *syngo Dynamics Server* does not support asynchronous operations window negotiation other than the default as specified by the DICOM specification.

3.1.1.4 Implementation Identifying Information

syngo Dynamics Server uses the following implementation identifying parameters:

- Implementation Class UID 1.2.124.113532.3510.82858
- Implementation Version Name AGFAOCT2007

3.1.2 Association Initiation by Real-World Activity

syngo Dynamics Server only initiates associations for the following real-world activities:

- Verify Communication
- Store Objects
- Request Storage Commitment
- Find Object
- Move Object
- Get Patient/Study Information
- Notification of Study Status Change

3.1.2.1 Real-World Activity - Verify Communication

3.1.2.1.1 Associated Real-World Activity – Verify Communication

syngo Dynamics Server will verify DICOM connections. An association is established when the user initiates a station test operation from the graphical user interface.

3.1.2.1.2 Proposed Presentation Contexts – Verify Communication

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-2.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 3.1-2 Proposed Presentation Contexts - Verify Communication

3.1.2.1.3 SOP Specific Conformance – Verify Communication

syngo Dynamics Server provides standard conformance to the DICOM Verification Service Class as an SCU.

3.1.2.2 Real-World Activity – Store Objects

3.1.2.2.1 Associated Real World-Activity – Store Objects

syngo Dynamics Server will send objects that have been sent to it previously to a remote AE for storage. An association is established when the user initiates a transmit request. *syngo Dynamics Server* will establish an association automatically in response to a C-MOVE request, archive to PACS autopilot notification or configured study routing rules.

3.1.2.2.2 Proposed Presentation Contexts – Store Objects

syngo Dynamics Server may propose any of the Presentation Contexts shown in Table 3.1-3.

syngo Dynamics Server will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian.

Presentation Context Table				
Abstract Syntax		**Transfer Syntax**	**Role**	**Extended Negotiation**
Name	**UID**	**Name** **UID**		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1	SCU	None

		JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE Lossless 1.2.840.10008.1.2.5 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None

Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE Lossless 1.2.840.10008.1.2.5 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Multi-frame Grayscale	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian 1.2.840.10008.1.2	SCU	None

Word Secondary Capture Image Storage		Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1	SCU	None

		JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE Lossless 1.2.840.10008.1.2.5 JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70	SCU	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian 1.2.840.10008.1.2	SCU	None

		Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70	SCU	None

Table 3.1-3 Proposed Presentation Contexts – Store Objects

3.1.2.2.3 SOP Specific Conformance – Store Objects

syngo Dynamics Server provides Standard conformance to the DICOM Storage Service Class as an SCU.

Depending on the *syngo Dynamics Server* Storage Commitment configuration, a successful C-Store response status may generate a corresponding Storage Commitment request per object stored or not generate any actions until all objects of the study have been stored.

An unsuccessful C-Store response will generate a warning dialog and the operation will remain in the Job Queue. The number of automated retry attempts and the time interval between each is configurable for each remote AE. The user is notified of storage failures. Studies are not removed from the system until successfully archived.

A warning status received in response to a C-Store operation will be treated in the same manner as an unsuccessful C-Store response.

3.1.2.3 Real-World Activity – Request Storage Commitment

3.1.2.3.1 Associated Real-World Activity – Request Storage Commitment

syngo Dynamics Server can send images to another SCP for permanent storage and request safe keeping of a set of SOP instances. *syngo Dynamics Server* expects a notification response from the SCP.

3.1.2.3.2 Proposed Presentation Contexts – Request Storage Commitment

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-4.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 3.1-4 Proposed Presentation Contexts – Request Storage Commitment

3.1.2.3.3 SOP Specific Conformance – Request Storage Commitment

syngo Dynamics Server provides partial conformance to the DICOM Storage Commitment Service Class as an SCU. The Action Type and Action Information specified in Table 3.1-5 are supported.

Action Type Name	Action Type ID	Attribute Name	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		> Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 3.1-5 Storage Commitment Request - Action Information

3.1.2.3.3.1 Operations

syngo Dynamics Server will generate an N-ACTION primitive if the local configuration setting for the remote AE is enabled for storage commitment. *syngo Dynamics Server* only supports the Storage AE as the destination for the storage commitment N-Action.

- *syngo Dynamics Server* may request storage commitment for all the SOP Class UIDs listed in Table 3.1-3.
- *syngo Dynamics Server* supports the Referenced Study Component Sequence Attribute.
- *syngo Dynamics Server* will keep the Transaction ID applicable indefinitely.
- *syngo Dynamics Server* does not support the optional Storage Media File-Set ID and UID Attributes in the N-Action
- *syngo Dynamics Server* can send a Storage Commitment request on a per object or per study basis.

3.1.2.3.3.1 Notifications

- *syngo Dynamics Server* does not perform any notification based actions when a success status is received.

- *syngo Dynamics Server* will generate a warning dialog and the operation will remain in the Job Queue when a failure status is received. The number of automated retry attempts and the time interval between each is configurable for each remote AE.

3.1.2.3.3.1 Implementation Specific Details

- If Storage Commitment is enabled for the Archive Storage AE:
  - *syngo* Dynamics Server will consider locally cached study data as available for deletion to free space if a successful Storage Commitment response was returned from that Storage AE for the objects in the commitment request and other deletion criteria are met. Only objects successfully committed are available for local deletion if space is needed.
- If Storage Commitment is not enabled for the Archive Storage AE
  - *syngo Dynamics Server* does not perform any actions when a success status is received.

- *syngo Dynamics Server* can be configured to send a Storage Commitment request on a per object or per study basis.

3.1.2.4 Real-World Activity – Find Object

3.1.2.4.1 Associated Real-World Activity – Find Object

syngo Dynamics Server can query a remote AE for composite objects to the Series Level. An association is established when the user initiates a query from the graphical user interface. *syngo Dynamics Server* will establish an association automatically to query a remote AE to obtain a list of relevant objects based on pre-fetch configuration rules.

3.1.2.4.2 Proposed Presentation Contexts – Find Object

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-6.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	Yes
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1				
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1				

Table 3.1-6 Proposed Presentation Contexts – Find Object

3.1.2.4.3 SOP Specific Conformance – Find Object

syngo Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCU. The Query/Retrieve Information Model used depends on the attributes used to constrain the query.

syngo Dynamics Server supports the Relational-queries extended SCU behavior. The Attributes used in the Patient Root Query are listed in Table 3.1-7. The Patient and Study Level Attributes in Table 3.1-7 are also supported for the Patient/Study Only Query/Retrieve.

Patient Root Query Attributes			
Level	**Description**	**Tag**	**Type**
Patient	Patient's Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	U

Patient	Patient's Birth Date	(0010,0030)	O
Patient	Patient's Sex	(0010,0040)	O
Patient	Current Patient Location	(0038,0300)	O
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring Physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Name of Physician(s) Reading Study	(0008,1060)	O
Study	Admitting Diagnoses Description	(0008,1080)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Study Related Instances	(0020,1208)	O
Study	Station Name	(0008,1010)	O
Study	Performing Physician's Name	(0008,1050)	O
Study	Study Status ID	(0032,000A)	O
Study	Requesting Physician	(0032,1032)	O
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Series Description	(0008,103E)	O
Series	Operator's Name	((0008,1070)	O

Table 3.1-7 Patient Root Query Attributes

Note 1: *syngo Dynamics Server* includes the Patient ID Attribute in all levels of the query and Study Instance UID Attribute in the Series level query.
Note 2: *syngo Dynamics Server* is capable of both upper and lower case letters in the Query/Retrieve User Interface fields.

syngo Dynamics Server supports the Relational-queries extended SCU behavior. The Attributes used in the Study Root Query are listed in Table 3.1-8.

Study Root Query Attributes			
Level	**Description**	**Tag**	**Type**
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Patient's Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring Physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Name of Physician(s) Reading Study	(0008,1060)	O
Study	Admitting Diagnoses Description	(0008,1080)	O
Study	Patient's Birth Date	(0010,0030)	O
Study	Patient's Sex	(0010,1040)	O
Study	Patient's Age	(0010,1010)	O
Study	Number of Study Related Instances	(0020,1208)	O
Study	Station Name	(0008,1010)	O

Study	Performing Physician's Name	(0009,1050)	O
Study	Study Status ID	(0032,000A)	O
Study	Requesting Physician	(0032,1032)	O
Study	Current Patient Location	(0038,0300)	O
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Series Description	(0008,103E)	O
Series	Operator's Name	((0008,1070)	O

Table 3.1-8 Study Root Query Attributes

Note 1: *syngo Dynamics Server* includes the Study Instance UID Attribute in the Series level query
Note 2: *syngo Dynamics Server* is limited to capital letters in the Query/Retrieve User Interface fields.

3.1.2.5 Real-World Activity – Move Object

3.1.2.5.1 Associated Real-World Activity – Move Object

syngo Dynamics Server can retrieve composite objects from a remote AE. An association is established when the user initiates a query from the graphical user interface. *syngo Dynamics Server* will establish an association automatically to retrieve objects that were archived to the remote AE or to pre-fetch relevant objects from the remote AE based on pre-fetch configuration rules.

3.1.2.5.2 Proposed Presentation Contexts – Move Object

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-9.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	Yes
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2				
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2				

Table 3.1-9 Proposed Presentation Contexts – Find Object

3.1.2.5.3 SOP Specific Conformance – Move Object

syngo Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCU.

- *syngo Dynamics Server* supports the Relational-retrieve extended SCU behavior.

3.1.2.6 Real-World Activity – Get Worklist

3.1.2.6.1 Associated Real-World Activity – Get Worklist

syngo Dynamics Server can query a remote AE for patient and study information that matches certain query constraints. *syngo Dynamics Server* will establish an association with a remote AE when the user initiates a query from the graphical user interface. *syngo Dynamics Server* will establish an association

automatically to verify an incoming study or if an unsolicited notification is received from a remote AE depending on HIS verification configuration rules.

3.1.2.6.2 Proposed Presentation Contexts – Get Worklist

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-10.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Worklist Information Model – FIND	1.2.840.10008.5.1.4.31	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None

Table 3.1-10 Proposed Presentation Contexts – Get Worklist

3.1.2.6.3 SOP Specific Conformance – Get Worklist

syngo Dynamics Server provides Standard conformance to the DICOM Basic Worklist Management Service Class as an SCU.

syngo Dynamics Server may request matching on the following Optional Matching Key Attributes:

Accession Number (0008,0050)
Referring Physician's Name (0008,0090)
Study Instance UID (0020,000D)
Study Status ID (0032,000A)
Scheduled Station Name (0040, 0400)

The Study Classification and Study Scheduling Modules are Extended SOP Class attributes and are not part of the Modality Worklist Information Model.

syngo Dynamics Server will use the format 20010101-20011231 for date range matching.

syngo Dynamics Server requests the Return Key attributes listed in Table 3.1-11.

Module	Attribute Name	Tag	Notes
Scheduled Procedure Step	Scheduled Procedure Step Sequence	(0040,0100)	
	>Scheduled Station AE Title	(0040,0001)	
	>Scheduled Procedure Step Start Date	(0040,0002)	See Note 1
	>Scheduled Procedure Step Start Time	(0040,0003)	
	>Modality	(0008,0060)	See Note 1
	> Scheduled Performing Physician's Name	(0040,0006)	
	>Scheduled Station Name	(0040,0010)	See Note 1
	>Comments on the Scheduled Procedure Step	(0040,0400)	
Requested Procedure	Requested Procedure ID	(0040,1001)	
	Requested Procedure Description	(0032,1060)	
	Requested Procedure Code Sequence	(0032,1064)	
	> Code Value	(0008,0100)	
	> Coding Scheme Designator	(0008,0102)	
	> Code Meaning	(0008,0104)	
	Study Instance UID	(0020,000d)	
	Reason for the Requested Procedure	(0040,1002)	
	Requested Procedure Comments	(0040,1400)	
Imaging Service Request	Accession Number	(0008,0050)	See Note 1
	Referring Physician's Name	(0008,0090)	
	Reason for Imaging Service Request	(0040,2001)	

Module	Attribute Name	Tag	Notes
	Imaging Service Request Comments	(0040,2400)	
Visit Identification	Admission ID	(0038,0010)	
Visit Status	Current Patient Location	(0038,0300)	
Visit Relationship	Referenced Patient Sequence	(0008,1120)	
	> Referenced SOP Instance UID	(0008,1155)	
Patient Identification	Patient's Name	(0010,0010)	See Note 1
	Patient ID	(0010,0020)	See Note 1
	Other Patient IDs	(0010,1000)	
	Patient's Birth Date	(0010,0030)	
	Patient's Sex	(0010,0040)	
	Patient's Age	(0010,1010)	
	Military Rank	(0010,1080)	
	Branch of Service	(0010,1081)	
Study Classification	Study Status ID	(0032,000a)	See Note 1
	Study Priority ID	(0032,000c)	
Study Scheduling	Requesting Physician	(0032,1032)	
	Requesting Service	(0032,1033)	

Table 3.1-11 Requested Return Key Attributes

Note 1: These attributes are available as query criteria in the Study Fixing interface.

3.1.2.7 Real-World Activity – Study Update

3.1.2.7.1 Associated Real-World Activity – Study Update

syngo Dynamics Server can update a remote AE when a study has been completed. *syngo Dynamics Server* will establish an association automatically to update study status based on configuration rules.

3.1.2.7.2 Proposed Presentation Contexts – Study Update

syngo Dynamics Server will propose the Presentation Contexts shown in Table 3.1-12.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Study Component Management	1.2.840.10008.3.1.2.3.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	None
Basic Study Content Notification	1.2.840.10008.1.9				
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3				

Table 3.1-12 Proposed Presentation Contexts – Study Update

3.1.2.7.3 SOP Specific Conformance – Study Update

syngo Dynamics Server provides standard conformance to the DICOM Study Content Notification and partial conformance to the Study Component Management Service Classes as an SCU. The Study Component Management is not conformant to PS3.4, however it is included in this document since some remote AEs do provide support for the *syngo*® Dynamics implementation.

syngo Dynamics Server will attempt to use Study Component Management over Basic Study Content Notification if both SOP classes are supported by the remote AE.

MPPS notifications are configurable in the user interface.

3.1.2.7.3.1 Study Component Management - Operations

syngo Dynamics Server can create an instance of the Study Component SOP and provide information about a specific real-world Study using the DIMSE N-CREATE Service.

syngo Dynamics Server does not provide the following Type1 Attributes:

Referenced Study Sequence (0008,1110)
>Referenced SOP Class UID (0008,1150)
>Referenced SOP Instance UID (0008,1155)

Procedure Code Sequence (0008,1032)
>Code Value (0008,1032)
>Coding Scheme Designator (0008,0102)
>Code Meaning (0008,0104)

syngo Dynamics Server will include the following Private Data Element:

Tag (0003,3000)
Name Patient Instance UID
VR UI
VM 1

syngo® Dynamics will provide the Attribute Values listed in Table 3.1-13.

Attribute Name	Tag
Specific Character Set	(0008,0005)
Modality	(0008,0060)
Study Component Status ID	(0032,1055)
Study Description	(0008,1030)
Study ID	(0020,0010)
Study Date	(0008,0020)
Study Time	(0008,0030)
Accession Number	(0008,0050)
Retrieve AE Title	(0008,0054)
Institution Name	(0008,0080)
Referring Physician's Name	(0008,0090)
Station Name	(0008,1010)
Institutional Department Name	(0008,1040)
Patient's Name	(0010,0010)
Patient ID	(0010,0020)
Patient's Birth Date	(0010,0030)
Patient's Sex	(0010,0040)
Other Patient IDs	(0010,1000)
Study Instance UID	(0020,000D)
Acquisition In Study	(0020,1004)
Study Status ID	(0032,000A)
Study Priority ID	(0032,000C)
Requesting Physician	(0032,1032)
Study Completion Date	(0032,1050)
Study Completion Time	(0032,1051)
Current Patient Location	(0038,0300)
Requested Procedure ID	(0040,1001)

Attribute Name	Tag
Patient Instance UID	(0003,3000)

Table 3.1-13 Study Component Management N-CREATE Attributes

3.1.2.7.3.2 Basic Study Content Notification

syngo Dynamics Server can issue a Basic Study Content Notification to a remote AE using the DIMSE N-CREATE Service to identify the change in study status.

- *syngo Dynamics Server* processes all Successful Response Status Code shown in Table 3.1-14 identically.

Service Status	Further Meaning	Response Status Codes
Success	Complete Study Content exists on system supporting SCP	0000
Success	Partial Study Content exists on system supporting SCP	0001
Success	None of the Study Content exists on system supporting SCP	0002
Success	It is unknown whether or not study content exists on system supporting SCP	0003
Failed	Failed Operation	Cxxx

Table 3.1-14 Study Content Notification Response Statuses

- *syngo Dynamics Server* includes the Basic Study Descriptor IOD Attributes shown in Table 3.1-15.

- *syngo Dynamics Server* always includes the Type 2C Elements indicated in Table 3.1-15 as part of the C-Store.

- *syngo Dynamics Server* includes the Attribute Accession Number (0008,0050) that is not part of the Basic Study Creator IOD.

Module	Attribute Name	Tag	Notes
Patient Summary	Patient's Name	(0010,0010)	
	Patient ID	(0010,0020)	
Study Content	Study ID	(0020,0010)	
	Study Instance UID	(0020,000D)	
	Referenced Series Sequence	(0008,1115)	
	>Series Instance UID	(0020,000E)	
	>Retrieve AE Title	(0008,0054)	Type 2C
	>Referenced Image Sequence	(0008,1140)	
	>Retrieve AE Title	(0008,0054)	Type 2C
	>Referenced SOP Class UID	(0008,1150)	
	>Referenced SOP Instance UID	(0008,1155)	
SOP Common	SOP Class UID	(0008,0016)	
	SOP Instance UID	(0008,0018)	
	Accession Number	(0008,0050)	Not part of IOD

Table 3.1-15 Basic Study Content Notification N-CREATE Attributes

3.1.2.7.3.3 Modality Performed Procedure Step

syngo Dynamics Server can create a Modality Performed Procedure Step instance on a remote AE using the DIMSE N-CREATE Service to identify the change in study status. This provides support to modalities without native MPPS support.

syngo® Dynamics will create a Modality Performed Procedure Step SOP Instance for a specified source if configured through the graphical user interface. Since *syngo Dynamics Server* only creates the SOP Instance when a study has been sent for storage, the status of DISCONTINUED is never used.

syngo® Dynamics will provide the N-CREATE Attributes Values shown in Table 3.1-16. These values are obtained from information contained within the image object.

syngo® Dynamics will provide the N-SET Attributes Values shown in Table 3.1-17.

Module	Attribute Name	Tag	Notes
PPS Relationship	Patient's Name	(0010,0010)	
	Patient ID	(0010,0020)	
	Patient's Birth Date	(0010,0030)	
	Patient's Sex	(0010,0040)	
	Referenced Patient Sequence	(0008,1120)	Empty
	Scheduled Step Attribute Sequence	(0040,0270)	
	>Study Instance UID	(0020,000D)	
	>Referenced Study Sequence	(0008,1110)	Empty
	>Accession Number	(0008,0050)	
	>Requested Procedure ID	(0040,1001)	
	>Requested Procedure Description	(0032,1060)	
	>Scheduled Procedure Step ID	(0040,0007)	
	>Scheduled Procedure Step Description	(0008,0054)	
	>Scheduled Action Item Code Sequence	(0040,0008)	Empty
PPS Information	Performed Station AE Title	(0040,0241)	
	Performed Station Name	(0040,0242)	
	Performed Location	(0040,0243)	Null Value
	Performed Procedure Step Start Date	(0040,0244)	
	Performed Procedure Step Start Time	(0040,0245)	
	Performed Procedure Step ID	(0040,0253)	
	Performed Procedure Step End Date	(0040,0250)	Null Value
	Performed Procedure Step End Time	(0040,00251)	Null Value
	Performed Procedure Step Status	(0040,0252)	IN PROGRESS
	Performed Procedure Step Description	(0040,0254)	
	Performed Procedure Type Description	(0040,0255)	
	Procedure Code Sequence	(0008,1032)	Empty
Image Acquisition Results	Modality	(0008,0060)	
	Study ID	(0020,0010)	
	Performed Action Item Sequence	(0040,0260)	Empty
	Performed Series Sequence	(0040,0340)	
	>Performing Physician's Name	(0008,1050)	
	>Operators' Name	(0008,1070)	
	>Protocol Name	(0018,1030)	
	>Series Instance UID	(0020,000E)	
	>Series Description	(0008,1030)	
	>Retrieve AE Title	(0008,0054)	
	>Referenced Image Sequence	(0008,1140)	
	>Referenced SOP Class UID	(0008,1150)	
	>Referenced SOP Instance UID	(0008,1155)	
	>Referenced Standalone SOP Instance Sequence	(0040,0220)	

Module	Attribute Name	Tag	Notes
	>Referenced SOP Class UID	(0008,1150)	
	>Referenced SOP Instance UID	(0008,1155)	

Table 3.1-16 Modality Performed Procedure Step N-CREATE Attributes

Module	Attribute Name	Tag	Notes
	Performed Procedure Step End Date	(0040,0250)	
	Performed Procedure Step End Time	(0040,00251)	
	Performed Procedure Step Status	(0040,0252)	COMPLETED
Image Acquisition Results	Performed Series Sequence	(0040,0340)	
	>Performing Physician's Name	(0008,1050)	
	>Operators' Name	(0008,1070)	
	>Protocol Name	(0018,1030)	
	>Series Instance UID	(0020,000E)	
	>Series Description	(0008,1030)	
	>Retrieve AE Title	(0008,0054)	*syngo Dynamics Server* AE Title
	>Referenced Image Sequence	(0008,1140)	
	>Referenced SOP Class UID	(0008,1150)	
	>Referenced SOP Instance UID	(0008,1155)	
	>Referenced Standalone SOP Instance Sequence	(0040,0220)	
	>Referenced SOP Class UID	(0008,1150)	
	>Referenced SOP Instance UID	(0008,1155)	

Table 3.1-17 Modality Performed Procedure Step N-SET Attributes

3.1.3 Association Acceptance Policy

syngo Dynamics Server accepts associations for the following real-world activities:

- Verify Communication
- Store Objects
- Request Storage Commitment
- Find Object
- Move Object
- Unsolicited Notifications
- Study Updates

Association requests from unknown Application Entities will be rejected by *syngo Dynamics Server*.

3.1.3.1 Real-World Activity - Verify Communication

3.1.3.1.1 Associated Real-World Activity – Verify Communication

syngo Dynamics Server will respond to communication verification requests from a remote AE.

3.1.3.1.2 Accepted Presentation Contexts – Verify Communication

syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-18.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Verification	1.2.840.10008.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 3.1-18 Accepted Presentation Contexts - Verify Communication

3.1.3.1.3 SOP Specific Conformance – Verify Communication

syngo Dynamics Server provides standard conformance to the DICOM Verification Service Class as an SCP.

3.1.3.1.4 Presentation Context Acceptance Criterion – Verify Communication

syngo Dynamics Server will only accept the Presentation Context listed in Table 3.1-18.

3.1.3.2 Real-World Activity – Store Objects

3.1.3.2.1 Associated Real-World Activity – Store Objects

A remote AE can send objects to *syngo Dynamics Server* for storage. All objects received by *syngo Dynamics Server* can be retrieved at a later time. The access time to retrieve the objects varies depending on object location. *syngo Dynamics Server* maintains four object states.

- ONLINE - Objects can be immediately retrieved from *syngo Dynamics Server*.
- NEARLINE – Objects can be retrieved from *syngo Dynamics Server*, however additional processing time is required.
- OFFLINE – Objects cannot be retrieved without human user intervention.
- PACS – Objects can be retrieved from the PACS AE used for archiving, however additional processing time may be required for the PACS to respond with the study data.

3.1.3.2.2 Accepted Presentation Contexts – Store Objects

syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-19.

Presentation Context Table				
Abstract Syntax		**Transfer Syntax**	**Role**	**Extended Negotiation**
Name	**UID**	**Name UID**		
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Digital X-Ray Image Storage – For Presentation	1.2.840.10008.5.1.4.1.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Digital X-Ray Image Storage – For Processing	1.2.840.10008.5.1.4.1.1.1.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None

CT Image Storage	1.2.840.10008.5.1.4.1.1.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Ultrasound Multi-frame Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Ultrasound Multi-frame Image Storage	1.2.840.10008.5.1.4.1.1.3.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 RLE Lossless 1.2.840.10008.1.2.5	SCP	None
Ultrasound Image Storage (Retired)	1.2.840.10008.5.1.4.1.1.6	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCU	None
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1	SCU	None

		JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 RLE Lossless 1.2.840.10008.1.2.5		
Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Multi-frame Single Bit Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Multi-frame Grayscale Byte Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Multi-frame Grayscale Word Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57	SCP	None

		JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Multi-frame True Color Secondary Capture Image Storage	1.2.840.10008.5.1.4.1.1.7.4	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Baseline (Process 1) 1.2.840.10008.1.2.4.50 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
12-lead ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
General ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.2	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Ambulatory ECG Waveform Storage	1.2.840.10008.5.1.4.1.1.9.1.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Hemodynamic Waveform Storage	1.2.840.10008.5.1.4.1.1.9.2.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Cardiac Electrophysiology Waveform Storage	1.2.840.10008.5.1.4.1.1.9.3.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1	SCP	None

		JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Basic Voice Audio Waveform Storage	1.2.840.10008.5.1.4.1.1.9.4.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
X-Ray Angiographic Image Storage	1.2.840.10008.5.1.4.1.1.12.1	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Nuclear Medicine Image Storage	1.2.840.10008.5.1.4.1.1.20	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Raw Data Storage	1.2.840.10008.5.1.4.1.1.66	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 RLE Lossless 1.2.840.10008.1.2.5 JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70	SCP	None
Basic Text SR	1.2.840.10008.5.1.4.1.1.88.11	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Enhanced SR	1.2.840.10008.5.1.4.1.1.88.22	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian	SCP	None

		1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70		
Comprehensive SR	1.2.840.10008.5.1.4.1.1.88.33	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless (Process 14) 1.2.840.10008.1.2.4.70	SCP	None
Positron Emission Tomography Image Storage	1.2.840.10008.5.1.4.1.1.128	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1 JPEG Lossless, Non-Hierarchical (Process 14) 1.2.840.10008.1.2.4.57 JPEG Lossless, Process 14 1.2.840.10008.1.2.4.70	SCP	None

Table 3.1-19 Accepted Presentation Contexts – Store Objects

syngo Dynamics Server supports Extended Negotiations for the Storage Service Class. *syngo*® Dynamics will supply the Sub Items shown in Table 3.1-20.

Filed Name	Value	Description of Field
Level of Support	2	Level 2 (Full) SCP
Element Coercion	0	Does not coerce any Data Elements

Table 3.1-20 Extended Negotiation – Store Objects

3.1.3.2.3 SOP Specific Conformance – Store Objects

syngo Dynamics Server provides conformance to the DICOM Storage Service Class as a Level 2 (Full) SCP.

No optional elements are discarded. All Type 1, Type 2 and Type 3 attributes will be retained. Private attributes will be stored and included when the object is sent out again. *syngo Dynamics Server* can decompress lossy compressed images and send them in uncompressed format. The Attribute Lossy Image Compression (0028,2110) remains “01”.

Upon successful storage of objects contained within a study the study can be automatically transferred to a remote AE or returned in response to a retrieval request. *syngo Dynamics Server* can be configured to automatically archive or delete objects contained within a study. Studies may be manually transferred, archived or deleted through the graphical user interface. Note that when an object gets transferred out of *syngo*® Dynamics by any of the above mentioned methods, the Institutional Name (0008,0080) and the Institutional Department Name (0008,1040) are set to reflect the Institutional Name and Department on *syngo*® Dynamics.

When an object is received that has a SOP Instance UID (0008,0018), Study Instance UID (0020,000D) and Series Instance UID (0020,000E) of an object that is already present on *syngo Dynamics Server* the existing object will be overwritten. When an object is received that has the same SOP Instance UID but

different Study Instance UID and Series Instance UID of an object that is already present on *syngo Dynamics Server*, the new object will be assigned a new SOP Instance UID by *syngo Dynamics Server*.

syngo Dynamics Server can be configured to lock an existing study after it has been marked as READ. *syngo Dynamics Server* will not accept new objects and return an Error status. The user will be notified.

syngo Dynamics Server will return the C-STORE status codes shown in Table 3.1-21.

Service Status	Further Meaning	Status Codes	Description
Refused	Out of resources	A700	Indicates that there was not enough storage space to store the image. Recovery from this condition is left to the administrative functions.
	SOP Class not supported	A800	Indicates that the SOP Class of the Image in the C-STORE operation did not match the Abstract Syntax negotiated for the Presentation Context.
Error	Data set does not match SOP Class	A900	Indicates that the Data Set does not encode an instance of the SOP Class specified.
	Failed	C000	The operation was not successful.
	Unable to register object, study locked; no new objects allowed	C005	Indicates that no new objects can be added to this study because it has been locked.
	Cannot understand	C005	Indicates that the Data Set cannot be parsed into elements.
Warning	Data set does not match SOP Class	B007	Indicates that the Data Set does not match the SOP Class, but that the image was stored anyway.
	Duplicate SOP Instance UID	D000	Indicates that the SOP Instance UID of the specified image is already stored in the database.
Success	Success	0000	Operation performed properly.

Table 3.1-21 C-STORE Status Codes

If HIS Verification is enabled, *syngo Dynamics Server* may modify the values of certain Attributes to match the values maintained by the HIS/RIS. *syngo Dynamics Server* will issue a Modality Worklist query and modify the values indicated in Table 3.1-22.

MWL Attribute Name	MWL Tag	Object Attribute Tag	Object Tag	Overwrite Values	Overwrite Nulls
Accession Number	(0008,0050)	Accession Number	(0008,0050)	Yes	
Referring Physician Name	(0008,0090)	Referring Physician Name	(0008,0090)	Yes	
Referenced Patient Sequence	(0008,1120)			Yes	
>Referenced SOP Instance UID	(0008,1155)	Patient SOP Instance UID (4)	(0003,3000)	Yes	
Patient's Name	(0010,0010)	Patient's Name	(0010,0010)	Yes	
Patient ID	(0010,0020)	Patient ID	(0010,0020)	Yes	
Patient's Birth Date	(0010,0030)	Patient's Birth Date	(0010,0030)	Yes	
Patient's Sex	(0010,0040)	Patient's Sex	(0010,0040)	Yes	
Other Patient IDs	(0010,1000)	Other Patient IDs	(0010,1000)	Yes	
Patient's Age	(0010,1010)	Patient's Age	(0010,1010)	Yes	
Military Rank	(0010,1080)	Military Rank	(0010,1080)	Yes	
Branch of Service	(0010,1081)	Branch of Service	(0010,1081)	Yes	
Study Instance UID	(0020,000D)	Study Instance UID	(0020,000D)	Yes	
Study Status ID	(0032,000A)	Study Status ID	(0032,000A)	Yes	

MWL Attribute Name	MWL Tag	Object Attribute Tag	Object Tag	Overwrite Values	Overwrite Nulls
Study Priority ID	(0032,000C)	Study Priority ID	(0032,000C)	Yes	
Requesting Physician	(0032,1032)	Requesting Physician	(0032,1032)	Yes	
Requesting Service	(0032,0033)	Requesting Service	(0032,0033)	Yes	
Requested Procedure Description	(0032,1060)	Study Description (1)	(0008,1030)	No*	Yes
Requested Procedure Code Sequence	(0032,1064)				
>Code Value	(0008,0100)	Code Value	(0008,0100)	Yes	
>Code Meaning	(0008,0104)	Study Description (1)	(0008,1030)	No*	Yes
Current Patient Location	(0038,0300)	Current Patient Location	(0038,0300)	No*	Yes
Scheduled Procedure Step Sequence	(0040,0100)				
>Modality	(0008,0060)	Modality	(0008,0060)	No	No
>Scheduled Procedure Step Start Date	(0040,0002)	Study Date	(0008,0020)	No	Yes
>Scheduled Procedure Step Start Time	(0040,0003)	Study Time	(008,0030)	No	Yes
>Scheduled Performing Physician's Name	(0040,0006)	Performing Physician's Name	(0008,1050)	Yes	
>Scheduled Station Name	(0040,0010)	Station Name	(0008,1010)	No	Yes
>Comments on the Scheduled Procedure Step	(0040,0400)	Study Comments (3)	(0032, 4000)	No*	Yes
Requested Procedure ID	(0040,1001)	Requested Procedure ID	(0040,1001)	Yes	
Reason for the Requested Procedure	(0040,1002)	Additional Patient History Reason for Study (2)	(0010,21B0) (0032,1030)	No	Yes
Requested Procedure Comments	(0040,1400)	Study Comments (3)	(0032,4000)	No*	Yes
Reason for the Imaging Service Request	(0040,2001)	Additional Patient History Reason for Study (2)	(0010,21B0) (0032,1030)	No	Yes
Imaging Service Request Comments	(0040,2400)	Study Comments (3)	(0032, 4000)	No*	Yes

Table 3.1-22 Modality Worklist to DICOM IOD Mapping

Notes:
* Default Overwrite Value behavior. This behavior can be changed through configuration.

(1) Order used to search for Study Description: First non-null value from Requested Procedure Description or Code Meaning.

(2) Order used to search for Additional Patient History and Reason for Study: First non-null value from Reason for the Requested Procedure or Reason for the Imaging Service Request.

(3) Order used to search for Study Comments: First non-null value from Comments on the Scheduled Procedure Step, Requested Procedure Comments or Imaging Service Request Comments.

(4) Patient SOP Instance UID is a Private Data Element maintained by *syngo Dynamics Server*.

3.1.3.2.4 Presentation Context Acceptance Criterion – Store Objects

syngo Dynamics Server will accept any number of Storage Presentation Contexts shown in Table 3.1-19 per association request. Any one Abstract Syntax may be specified more than once in an association request if the transfer syntaxes differ between Presentation Contexts.

3.1.3.2.5 Transfer Syntax Selection Policies

syngo Dynamics Server will prefer a compressed Transfer Syntax over an uncompressed Transfer Syntax. Lossless Compression is preferred over Lossy Compression and Explicit VR Little Endian is preferred over Implicit VR Little Endian.

3.1.3.3 Real-World Activity – Request Storage Commitment

3.1.3.3.1 Associated Real-World Activity – Request Storage Commitment

syngo Dynamics Server stores objects sent by a remote AE. The remote AE can transmit a Storage Commitment Request with a list of references to one or more SOP Instances. *syngo Dynamics Server* will return a Storage Commitment Result to the remote AE.

3.1.3.3.2 Accepted Presentation Contexts – Request Storage Commitment

syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-23.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Storage Commitment Push Model	1.2.840.10008.1.20.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None

Table 3.1-23 Accepted Presentation Contexts - Request Storage Commitment

3.1.3.3.3 SOP Specific Conformance – Request Storage Commitment

syngo Dynamics Server provides partial conformance to the DICOM Storage Commitment Service Class as an SCP.

3.1.3.3.3.1 Request Storage Commitment – Operations

syngo Dynamics Server will store SOP Instances indefinitely unless the instances are manually deleted by a user with appropriate system permissions. The capacity is limited only by the availability of archive storage and volatility is dependent on the archive medium used. *syngo Dynamics Server* will stop accepting new objects for storage to ensure the availability of objects for which a successful storage commitment response has been sent.

syngo Dynamics Server can be configured not to archive objects received from a remote AE. A successful storage commitment request will be returned to the remote AE, however the persistence of storage will be dependent on the amount of storage capacity available on *syngo Dynamics Server* and disk management configuration settings of the system.

syngo Dynamics Server does not support the optional Storage Media and File-Set ID and UID Attributes in the N-ACTION. *syngo Dynamics Server* supports the Action Type and Action Information shown in Table 3.1-24.

Action Type Name	Action Type ID	Attribute	Tag
Request Storage Commitment	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 3.1-24 Storage Commitment Request – Action Information

3.1.3.3.3.2 Request Storage Commitment – Notifications

syngo Dynamics Server will process the Storage Commitment Request determine if the SOP Instances have been successfully committed to storage. *syngo Dynamics Server* will generate a Storage Commitment Result that will always be sent on a separate association and includes references to the successfully and unsuccessfully stored SOP Instances.

syngo Dynamics Server does not support the optional Storage Media and File-Set ID and UID or Retrieve AE Title (0008,0054) Attributes in the N-EVENT-REPORT. *syngo Dynamics Server* supports the Event Type and Event Information shown in Table 3.1-25.

Event Type Name	Event Type ID	Attribute	Tag
Storage Commitment Request Successful	1	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
Storage Commitment Request Complete – Failures Exist	2	Transaction UID	(0008,1195)
		Referenced SOP Sequence	(0008,1199)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Failed SOP Sequence	(0008,1198)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)
		Referenced Study Component Sequence	(0008,1111)
		>Referenced SOP Class UID	(0008,1150)
		>Referenced SOP Instance UID	(0008,1155)

Table 3.1-25 Storage Commitment Result – Event Information

3.1.3.3.4 Presentation Context Acceptance Criterion – Request Storage Commitment

syngo Dynamics Server will only accept the Presentation Context listed in Table 3.1-23.

3.1.3.3.5 Transfer Syntax Selection Policies – Request Storage Commitment

syngo Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

3.1.3.4 Real-World Activity – Find Object

3.1.3.4.1 Associated Real World Activity – Find Object

syngo Dynamics Server will respond to a query request by a remote AE. *syngo Dynamics Server* supports queries for composite objects at the Instance Level.

syngo Dynamics Server supports the query/retrieve services indicated in Table 3.1-26. The latency for retrieval of SOP Instances is dependent on the object state:

- ONLINE - Objects can be immediately retrieved from *syngo Dynamics Server*.
- NEARLINE – Objects can be retrieved from *syngo Dynamics Server*, however additional processing time is required.
- OFFLINE – Objects cannot be retrieved without human user intervention.
- PACS – Objects can be retrieved from the *syngo Dynamics Server* however additional processing time is required for the data to be retrieved from the PACS.

syngo Dynamics Server can be configured to return results for objects with an ONLINE state only or all objects maintained in the *syngo*® Dynamics Database regardless of state.

3.1.3.4.2 Accepted Presentation Contexts – Find Object

syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-26.

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	**UID**	**Name**	**UID**		
Patient Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Yes
Study Root Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.2.1				
Patient/Study Only Query/Retrieve IM Find	1.2.840.10008.5.1.4.1.2.3.1				

Table 3.1-26 Accepted Presentation Contexts – Find Object

3.1.3.4.3 SOP Specific Conformance – Find Object

syngo Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP.

syngo Dynamics Server supports the Relational-queries extended SCP behavior. *syngo Dynamics Server* supports all mandatory Unique and Required Matching Keys. Case-insensitive matching for PN VR attributes is supported.

syngo Dynamics Server provides support for the Instance Availability (0008,0056) Data Element.

Attributes supported in the Patient Root Query are listed in Table 3.1-27.

Patient Root Query Attributes			
Level	**Description**	**Tag**	**Type**
Patient	Patient's Name	(0010,0010)	R
Patient	Patient ID	(0010,0020)	U
Patient	Patient's Birth Date	(0010,0030)	O
Patient	Patient's Sex	(0010,0040)	O
Patient	Other Patient Ids	(0010,1000)	O
Patient	Patient Instance UID	(0003,3000)	O Note 1
Patient	Current Patient Location	(0038,0300)	O Note 2
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring Physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Name of Physician(s) Reading Study	(0008,1060)	O
Study	Admitting Diagnoses Description	(0008,1080)	O
Study	Patient's Age	(0010,1010)	O
Study	Additional Patient History	(0010,21B0)	O
Study	Number of Study Related Instances	(0020,1208)	O
Study	Station Name	(0008,1010)	O Note 2
Study	Performing Physician's Name	(0008,1050)	O Note 2
Study	Study Status ID	(0032,000A)	O Note 2
Study	Requesting Physician	(0032,1032)	O Note 2
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U

Series	Series Description	(0008,103E)	O
Series	Operator's Name	(0008,1070)	O
Series	Body Part Examined	(0018,0015)	O
Instance	Instance Number	(0020,0013)	R
Instance	SOP Instance UID	(0008,0018)	U

Table 3.1-27 Patient Root Query Attributes

Note 1: Patient Instance UID (0003,3000) is a Private Attribute maintained by *syngo Dynamics Server* that can be returned by standard queries.

Note 2: These Attributes are not part of the Q/R Information Model.

syngo Dynamics Server supports the Relational-queries extended SCP behavior. The Attributes supported in the Study Root Query are listed in Table 3.1-28.

Study Root Query Attributes			
Level	**Description**	**Tag**	**Type**
Study	Study Date	(0008,0020)	R
Study	Study Time	(0008,0030)	R
Study	Accession Number	(0008,0050)	R
Study	Patient's Name	(0010,0010)	R
Study	Patient ID	(0010,0020)	R
Study	Study ID	(0020,0010)	R
Study	Study Instance UID	(0020,000D)	U
Study	Modalities in Study	(0008,0061)	O
Study	Referring Physician's Name	(0008,0090)	O
Study	Study Description	(0008,1030)	O
Study	Name of Physician(s) Reading Study	(0008,1060)	O
Study	Admitting Diagnoses Description	(0008,1080)	O
Study	Patient's Birth Date	(0010,0030)	O
Study	Patient's Sex	(0010,1040)	O
Study	Other Patient Ids	(0010,1000)	O
Study	Patient's Age	(0010,1010)	O
Study	Additional Patient History	(0010,21B0)	O
Study	Number of Study Related Instances	(0020,1208)	O
Study	Patient Instance UID	(0003,3000)	O Note 1
Study	Station Name	(0008,1010)	O Note 2
Study	Performing Physician's Name	(0008,1050)	O Note 2
Study	Study Status ID	(0032,000A)	O Note 2
Study	Requesting Physician	(0032,1032)	O Note 2
Study	Current Patient Location	(0038,0300)	O Note 2
Series	Modality	(0008,0060)	R
Series	Series Number	(0020,0011)	R
Series	Series Instance UID	(0020,000E)	U
Series	Series Description	(0008,103E)	O
Series	Operator's Name	(0008,1070)	O
Series	Body Part Examined	(0018,0015)	O
Instance	Instance Number	(0020,0013)	R
Instance	SOP Instance UID	(0008,0018)	U

Table 3.1-28 Study Root Query Attributes

Note 1: Patient Instance UID (0003,3000) is a Private Attribute maintained by *syngo Dynamics Server* that can be returned by standard queries.

Note 2: These Attributes are not part of the Q/R Information Model.

The Patient and Study Level Attributes in Table 3.1-27 are also supported for the Patient/Study Only Query/Retrieve.

syngo Dynamics Server will return the C-FIND status codes shown in Table 3.1-29.

Service Status	Further Meaning	Status Codes	Description
Refused	Out of resources	A700	
Failed	Identifier does not match SOP Class	A900	
	Unable to Process	C001	*syngo Dynamics Server* can not process the request at this time.
Cancel	Matching terminated due to Cancel Request	FE00	The original requester canceled this operation.
Pending	Pending	FF00	All Optional Keys are supported in the same manner as Required Keys.
	Pending	FF01	The matching operation is continuing. Warning that one or more Optional Keys were not supported in the same manner as Required.
Success	Success	0000	Operation performed properly.

Table 3.1-29 C-FIND Status Codes

3.1.3.4.4 Presentation Context Acceptance Criterion – Find Object
syngo Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-26.

3.1.3.4.5 Transfer Syntax Selection Policies – Find Object
syngo Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

3.1.3.5 Real-World Activity – Move Object

3.1.3.5.1 Associated Real World Activity – Move Object
syngo Dynamics Server will respond to an object move request by a remote AE. *syngo Dynamics Server* supports move requests for composite objects at the Instance Level.

syngo Dynamics Server will establish a new Association with the Remote AE specified in the Move Destination for the C_STORE sub-operations. *syngo Dynamics Server* will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian. Actions specific to the C-STORE sub-operations are detailed in Section 3.1.2.2.

3.1.3.5.2 Accepted Presentation Contexts – Move Object
syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-30.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		

Patient Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.1.2	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	Yes
Study Root Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.2.2				
Patient/Study Only Query/Retrieve IM Move	1.2.840.10008.5.1.4.1.2.3.2				

Table 3.1-30 Accepted Presentation Contexts – Move Object

3.1.3.5.3 SOP Specific Conformance – Move Object

syngo Dynamics Server provides standard conformance to the DICOM Query/Retrieve Service Class as an SCP.

syngo Dynamics Server supports the Relational-retrieval extended SCP behavior. *syngo Dynamics Server* supports C-STORE sub-operations for all Storage SOP Classes detailed in Section 3.1.2.2.

syngo Dynamics Server will return the C-MOVE status codes shown in Table 3.1-31.

Service Status	Further Meaning	Status Codes	Description
Refused	Out of resources	A701	Unable to calculate number of matches.
	Out of Resources	A702	Unable to perform storage of images to move destination.
Failed	Move Destination Unknown	A801	The destination of this move request is unknown.
	Identifier does not match SOP Class	A900	The specified identifier contains a request that does not match the specified SOP Class.
	Unable to Process	C002	*syngo Dynamics Server* can not process the request at this time.
Cancel	Sub-operations terminated due to Cancel Indication	FE00	The original requester canceled this operation.
Warning	Sub-operations Complete – One or more Failures	B000	Storage complete with one or more failures.
Pending	Sub-Operations are Continuing	FF00	The Storage sub-operation is continuing.
	Sub-Operations are Continuing	FF02	The Storage sub-operation is expected to require a long period of time to complete. The SCU may break the Association at any time but the operation will continue to completion.
Success	Success	0000	Operation performed properly.

Table 3.1-31 C-MOVE Status Codes

3.1.3.5.4 Presentation Context Acceptance Criterion – Move Object

syngo Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-30.

3.1.3.5.5 Transfer Syntax Selection Policies – Move Object

syngo Dynamics Server only supports Implicit VR Little Endian for this C-MOVE operation of this Real World Activity. *syngo Dynamics Server* will propose the transfer syntax used when the object was initially accepted by the server and Implicit VR Little Endian in the C-STORE sub-operation of the Real World Activity.

3.1.3.6 Real-World Activity – Unsolicited Notifications

3.1.3.6.1 Associated Real World Activity – Unsolicited Notifications

syngo Dynamics Server will accept unsolicited notifications from a remote AE.

3.1.3.6.2 Accepted Presentation Contexts – Unsolicited Notifications

syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-32.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Detached Patient Management	1.2.840.10008.3.1.2.1.1	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No
Detached Visit Management	1.2.840.10008.3.1.2.2.1				
Detached Study Management	1.2.840.10008.3.1.2.3.1				
Detached Interpretation Management	1.2.840.10008.3.1.2.6.1				

Table 3.1-32 Accepted Presentation Contexts – Unsolicited Notifications

3.1.3.6.3 SOP Specific Conformance – Unsolicited Notifications

syngo Dynamics Server provides standard conformance to the DICOM Patient Management, Study Management and Results Management Service Classes as an SCU.

3.1.3.6.3.1 Detached Patient Management - Notifications

syngo Dynamics Server supports the DIMSE N-EVENT REPORT for the Event Types shown in Table 3.1-33.

The Patient Created and Patient Deleted Event Types do not initiate any action by *syngo Dynamics Server*.

Event Type Name	Event Type ID
Patient Created	*1*
Patient Deleted	*2*
Patient Updated	3

Table 3.1-33 Patient Notification Event Types

When *syngo Dynamics Server* receives a Patient Updated Event Type, it will update all studies which are referenced by the Referenced Study Sequence (0008,1110) contained in the Data Set. If no Referenced Study Sequence is sent, *syngo Dynamics Server* will update all studies which contain the same Patient Instance UID as the Affected SOP Instance UID in the Command Set of the Event.

The only Attributes that may be updated by a Patient Updated Event Type are:

Patient Name	(0010,0010)
Patient ID	(0010,0020)
Patient Birth Date	(0010,0030)
Patient Sex	(0010,0040)

Other Patient Ids	(0010,1000)
Current Patient Location	(0038,0300)

3.1.3.6.3.2 Detached Visit Management – Notifications

syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Table 3.1-34.

The Visit Created, Patient Admitted, Patient Discharged, Visit Deleted and Visit Updated Event Types do not initiate any action by *syngo Dynamics Server*.

Event Type Name	Event Type ID
Visit Created	*1*
Visit Scheduled	2
Patient Admitted	*3*
Patient Transferred	4
Patient Discharged	*5*
Visit Deleted	*6*
Visit Updated	*7*

Table 3.1-34 Visit Notification Event Types

When a Visit Scheduled Event is received, *syngo Dynamics Server* can pre-fetch prior studies based on configuration rules.

When a Patient Transferred Event is received, *syngo Dynamics Server* will search for all studies which contain the same Patient Instance UID as the Referenced Patient Sequence and the same Study Instance UID as the Referenced Study Sequence. *syngo Dynamics Server* will update the Current Patient Location field.

3.1.3.6.3.3 Detached Study Management – Notifications

syngo Dynamics Server supports the DIMSE N-EVENT REPORT for the Event Types shown in Table 3.1-35.

The Study Started, Study Completed, Study Verified and Study Deleted Event Types do not initiate any action by *syngo Dynamics Server*.

Event Type Name	Event Type ID
Study Created	1
Study Scheduled	2
Patient Arrived	3
Study Started	*4*
Study Completed	*5*
Study Verified	*6*
Study Read	7
Study Deleted	*8*
Study Updated	9

Table 3.1-35 Study Notification Event Types

When *syngo Dynamics Server* receives a Study Notification Event, it will use the Affected SOP Instance UID in the Command Set of the Event as the Study Instance UID in a Modality Worklist query. The Study Instance UID will be the only matching Attribute in the query. The Modality Worklist query is described in Section 3.1.2.6.3.

syngo Dynamics Server can use the results returned from the query to update the study and apply configured pre-fetching rules.

syngo Dynamics Server does not use any of the Attributes contained within the Data Set of the Event.

3.1.3.6.3.4 Detached Interpretation Management – Notifications
syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Table 3.1-36.

The Interpretation Created and Interpretation Deleted Event Types do not initiate any action by *syngo Dynamics Server*.

Event Type Name	Event Type ID
Interpretation Created	*1*
Interpretation Recorded	2
Interpretation Transcribed	3
Interpretation Approved	4
Interpretation Deleted	*5*
Interpretation updated	6

Table 3.1-36 Interpretation Notification Event Types

syngo Dynamics Server will update the reported status field in the database depending on the Event Type Received.

3.1.3.6.4 Presentation Context Acceptance Criterion – Unsolicited Notifications
syngo Dynamics Server will accept any of the Presentation Contexts listed in Table 3.1-32.

3.1.3.6.5 Transfer Syntax Selection Policies – Unsolicited Notifications
syngo Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

3.1.3.7 Real-World Activity – Study Updates

3.1.3.7.1 Associated Real-World Activity – Study Updates
A remote AE may connect to the *syngo Dynamics Server* to send a Modality Performed Procedure Step (MPPS) message to share a change in the status of the procedure step. *syngo Dynamics Server* will reflect a status change of a study when it receives an MPPS message from the acquisition device. DISCONTINUED statuses will not be reflected as DISCONTINUED on the *syngo Dynamics Server* – the previous status will remain in effect.

3.1.3.7.2 Accepted Presentation Contexts – Study Updates
syngo Dynamics Server will accept the Presentation Contexts shown in Table 3.1-18.

Presentation Context Table					
Abstract Syntax		Transfer Syntax		Role	Extended Negotiation
Name	UID	Name	UID		
Modality Performed Procedure Step	1.2.840.10008.3.1.2.3.3	Implicit VR Little Endian 1.2.840.10008.1.2 Explicit VR Little Endian 1.2.840.10008.1.2.1	1.2.840.10008.1.2	SCP	None

Table 3.1-37 Accepted Presentation Contexts – Study Updates

3.1.3.7.3 SOP Specific Conformance – Study Updates

syngo Dynamics Server provides standard conformance to the DICOM Modality Performed Procedure Step SOP Class as an SCP.

3.1.3.1.4 Presentation Context Acceptance Criterion – Study Updates

syngo Dynamics Server will only accept the Presentation Context listed in Table 3.1-37.

4. COMMUNICATION PROFILES

4.1 SUPPORTED COMMUNICATION STACKS

syngo Dynamics Server provides DICOM V3.0 TCP/IP Network Communication Support as defined in Part 8 of the DICOM Standard

4.2 OSI STACK

Not supported.

4.3 TCP/IP STACK

syngo Dynamics Server DICOM services use the TCP/IP stack from the Microsoft Windows 2003 Server operating system upon which it executes.

4.3.1 Physical Media Support

syngo Dynamics Server DICOM services are not dependent on the physical medium over which the TCP/IP executes.

4.4 POINT-TO-POINT STACK

Not Supported.

5. EXTENSIONS/SPECIALIZATIONS/PRIVATIZATIONS

5.1 PRIVATE SOPS

The *syngo Dynamics Server* Application Entity provides Conformance to the private SOP Classes listed in Table 5.1-1 as an SCU and/or SCP:

SOP Class	SOP Class UID	SCU/SCP
Acuson Structured Report Detail Storage	1.2.840.10008.5.1.4.1.1.88.3	Y/Y
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Y/Y
Mitra Detached Patient Management	1.2.840.113532.3500.10	Y/N
Mitra Detached Visit Management	1.2.840.113532.3500.11	Y/N
Mitra Detached Study Management	1.2.840.113532.3500.13	Y/N
Mitra Detached Interpretation Management	1.2.840.113532.3500.16	Y/N

Table 5.1-1 *syngo Dynamics Server* Supported SOP Classes

5.1.1 Association Initiation by Real-World Activity

syngo Dynamics Server only initiates associations for the following real-world activities:

- Store Private Objects

5.1.1.1 Real-World Activity – Store Private Objects

5.1.1.1.1 Associated Real World-Activity – Store Private Objects

syngo Dynamics Server will send private objects that have been sent to it previously to a remote AE for storage. An association is established when the user initiates a transmit request. *syngo Dynamics Server* will establish an association automatically in response to a C-MOVE request, archive to PACS autopilot notification or configured study routing rules.

5.1.1.1.2 Proposed Presentation Contexts – Store Private Objects

syngo Dynamics Server may propose any of the Presentation Contexts shown in Table 5.1-2.

Presentation Context Table				
Abstract Syntax		Transfer Syntax	Role	Extended Negotiation
Name	UID	Name UID		
Acuson Structured Report Detail Storage	1.2.840.10008.5.1.4.1.1.88.3	Implicit VR Little Endian 1.2.840.10008.1.2	SCU	None
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Implicit VR Little Endian 1.2.840.10008.1.2	SCU	None

Table 5.1-2 Proposed Presentation Contexts – Store Private Objects

5.1.1.1.3 SOP Specific Conformance – Store Private Objects

syngo Dynamics Server provides conformance as specified in Section 3.1.2.2.

5.1.2 Association Acceptance Policy

syngo Dynamics Server accepts associations for the following real-world activities:

- Store Private Objects
- Private Notification of Patient/Study Information Change

5.1.2.1 Real-World Activity – Store Private Objects

5.1.2.1.1 Associated Real World-Activity – Store Private Objects
A remote AE can send private objects to *syngo Dynamics Server* for storage. All private objects received by *syngo Dynamics Server* can be retrieved at a later time as described in Section 3.1.3.2.

5.1.2.1.2 Accepted Presentation Contexts – Store Private Objects
syngo Dynamics Server will accept the Presentation Contexts shown in Table 5.1-3.

Presentation Context Table				
Abstract Syntax		**Transfer Syntax**	**Role**	**Extended Negotiation**
Name	**UID**	**Name UID**		
Acuson Structured Report Detail Storage	1.2.840.10008.5.1.4.1.1.88.3	Implicit VR Little Endian 1.2.840.10008.1.2	SCP	None
Siemens CSA Non-Image Storage	1.3.12.2.1107.5.9.1	Implicit VR Little Endian 1.2.840.10008.1.2	SCP	None

Table 5.1-3 Accepted Presentation Contexts – Store Private Objects

5.1.2.1.3 SOP Specific Conformance – Store Private Object
syngo Dynamics Server provides conformance as specified in Section 3.1.3.2.

5.1.2.1.4 Presentation Context Acceptance Criterion – Store Private Object
syngo Dynamics Server will accept any of the Presentation Contexts listed in Table 5.1-3.

5.1.2.1.5 Transfer Syntax Selection Policies – Store Private Objects
syngo Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

5.1.2.2 Real-World Activity – Unsolicited Private Notifications

5.1.2.2.1 Associated Real World Activity – Unsolicited Private Notifications
syngo Dynamics Server will accept unsolicited private notifications from a remote AE.

5.1.2.2.2 Accepted Presentation Contexts – Unsolicited Private Notifications
syngo Dynamics Server will accept the Presentation Contexts shown in Table 5.1-4.

Presentation Context Table					
Abstract Syntax		**Transfer Syntax**		**Role**	**Extended Negotiation**
Name	**UID**	**Name**	**UID**		
Mitra Detached Patient Management	1.2.840.113532.3500.10	Implicit VR Little Endian	1.2.840.10008.1.2	SCU	No
Mitra Detached Visit Management	1.2.840.113532.3500.11				
Mitra Detached Study Management	1.2.840.113532.3500.13				
Mitra Detached Interpretation Management	1.2.840.113532.3500.16				

Table 5.1-4 Accepted Presentation Contexts – Unsolicited Private Notifications

5.1.2.2.3 SOP Specific Conformance – Unsolicited Private Notifications

syngo Dynamics Server provides support for Mitra Private Service Classes as an SCU. *syngo Dynamics Server* performs the same actions as the Standard DICOM equivalent Service Classes.

5.1.2.2.3.1 Mitra Detached Patient Management - Notifications

syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Section 3.1.3.6.3.1.

5.1.2.2.3.2 Mitra Detached Visit Management – Notifications

syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Section 3.1.3.6.3.2.

5.1.2.2.3.3 Mitra Detached Study Management – Notifications

syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Section 3.1.3.6.3.3.

5.1.2.2.3.4 Mitra Detached Interpretation Management – Notifications

syngo Dynamics Server supports the DIMSE N-EVENT-REPORT for the Event Types shown in Section 3.1.3.6.3.4.

5.1.2.2.4 Presentation Context Acceptance Criterion – Unsolicited Private Notifications

syngo Dynamics Server will accept any of the Presentation Contexts listed in Table 5.1-4. *syngo Dynamics Server* will prefer the Private SOP Classes over the Standard DICOM equivalent Service Classes.

5.1.2.2.5 Transfer Syntax Selection Policies – Unsolicited Private Notifications

syngo Dynamics Server only supports Implicit VR Little Endian for this Real World Activity.

6. CONFIGURATION

6.1 AE TITLE/PRESENTATION ADDRESS MAPPING

The AE Title for *syngo Dynamics Server* is the NetBIOS Name of the computer. This parameter can be configured at time of install. Mapping from AE Title to TCP/IP addresses and ports is maintained within the *syngo Dynamics Server* database and set at time of installation.

6.2 CONFIGURABLE PARAMETERS

The configurable parameters of the *syngo Dynamics Server* are stored in the database. The following items are configurable:

Remote AE Title	Allows the *syngo Dynamics Server* to initiate or accept associations from a remote AE.
Port	Listening Port used by the remote AE uses to accept DICOM communications.
Packet Size	The maximum size in bytes of the packet used to communicate with the remote AE.
Read Timeout	How long a communication pause is tolerated before the connection is reset.
Connect Timeout	How long *syngo Dynamics Server* waits for a response when trying to establish communication with the remote AE.

7. SUPPORT OF EXTENDED CHARACTER SETS

syngo Dynamics Server supports the following character sets:

- ISO-IR 6 (default) Default repertoire
- ISO-IR 100 Latin Alphabet No. 1

syngo Dynamics Server does not support multi-byte characters.